

### **REMARKS**

Claims 1-5 are pending in the current application. Reconsideration and allowance of the application is respectfully requested.

#### **Claim Rejections under 35 U.S.C. § 102**

Claims 1 and 3-5 are rejected under 35 U.S.C. 102 (e) as being anticipated by Ooi et al. (U.S. Patent Number 6, 606,424). This rejection is respectfully traversed.

Independent claim 1 of the present invention recites, *inter alia*, “a mixer generating a modulator input by mixing data with a half clock signal” and “an external modulator generating a CS-RZ signal, in which phases of adjacent pulses are inverted, by applying bias voltage to the modulator input data, which has been amplified by the driver amplifier, to be placed at a null point of a transfer function of the external modulator.”

In the Office Action, the Examiner alleges that Ooi et al. teaches a mixer generating a modulator input by mixing data with a half clock signal in column 16, lines 56-58, and Fig. 22. Applicants respectfully submit that in Figs. 21 and 22 and the corresponding description between column 16, line 30, and column 17, line 51, in the specification of Ooi et al., two independent electric signals to be modulated are supplied respectively to two electrodes of a double-sided electrode Mach-Zehnder optical modulator through two different paths. More exactly, each electric signal is processed by a driving circuit and an LPF as it travels through its own path. The two electric signals have the same bit rate, and a T/2 delay unit is used to delay the phase of one of the signals by half a bit. In example embodiments according to claim 1 of the present invention, a mixer is used to mix data signals with a half-clock signal having a frequency of half that of the data signals in order to generate CS-RZ-shaped signals. Ooi et al. does not disclose anything about this feature, namely, a mixer generating a modulator input by mixing data with a half-clock signal, as recited in claim 1.

The Examiner further alleges that Ooi et al. teaches an external modulator generating a CS-RZ signal, in which phases of adjacent pulses are inverted, by applying bias voltage to the modulator input data, which has been amplified by the driver amplifier, to be placed at a null point of a transfer function of the external modulator. In particular, the Examiner interpreted “the bias voltage sets DC potential voltage to be zero” disclosed in column 17 lines 25-36 of Ooi et al. as corresponding to applying bias voltage to a null point of a transfer function of the modulator as recited in claim 1 of the present invention. Applicants respectfully submit that it is obvious from column 17, lines 25-36, and the corresponding description of Fig. 2 of Ooi et al. that the optical modulation characteristics are only affected by a potential difference arising between the two electrodes, and therefore the DC potential to be supplied to the biastee #1 is set to 0V and only one bias voltage needs to be supplied. In Ooi et al., setting the DC potential to be 0V is not related to generating CS-RZ-shaped signals. In contrast, in the present invention, the modulator is biased at the null point of a transfer function of the external modulator in order to generate CS-RZ-shaped signals. Therefore, Ooi et al. fails to disclose an external modulator generating a CS-RZ signal, in which phases of adjacent pulses are inverted, by applying bias voltage to the modulator input data, which has been amplified by the driver amplifier, to be placed at a null point of a transfer function of the external modulator, as recited in claim 1 of the present invention.

Accordingly, Applicants respectfully submit that claim 1 of the present invention is not anticipated or rendered obvious by Ooi et al. Claims 3-5 are allowable at least because they depend on independent claim 1. The withdrawal of the rejection is respectfully requested.

#### **Claims Rejections Under 35 U.S.C. § 103**

Claim 2 is rejected under 35 U.S.C. 103 § (a) as being unpatentable over Ooi et al.

Applicants respectfully submit that claim 2 is allowable at least because it depends upon allowable independent claim 1. Withdrawal of the rejection is respectfully requested.

Reconsideration and issuance of the present application is respectfully requested.

**CONCLUSION**

Accordingly, in view of the above amendments and remarks, reconsideration of the objections and rejections and allowance of the present application is earnestly solicited.

Should there be any outstanding matters that need to be resolved in the present application; the Examiner is respectfully requested to contact the undersigned at the telephone number of the undersigned below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,  
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